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NOAA Technical Report NMFS CIRC-385

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National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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Fishery Publications, Calendar Year 1972: Lists and Indexes

LEE C. THORSON and MARY ELLEN ENGETT

SEATTLE, WA
NOVEMBER 1973

National Marine Fisheries Service, Circulars

The major responsibilities of the National Marine Fisheries Service (NMFS) are to monitor and assess the abundance and geographic distribution of fishery resources, to understand and predict fluctuations in the quantity and distribution of these resources, and to establish levels for optimum use of the resources. NMFS is also charged with the development and implementation of policies for managing national fishing grounds, development and enforcement of domestic fisheries regulations, surveillance of foreign fishing off United States coastal waters, and the development and enforcement of international fishery agreements and policies. NMFS also assists the fishing industry through marketing service and economic analysis programs, and mortgage insurance and vessel construction subsidies. It collects, analyses, and publishes statistics on various phases of the industry.

The NOAA Technical Report NMFS CIRC series continues a series that has been in existence since 1941. The Circulars are technical publications of general interest intended to aid conservation and management. Publications that review in considerable detail and at a high technical level certain broad areas of research appear in this series. Technical papers originating in economics studies and from management investigations appear in the Circular series.

NOAA Technical Reports NMFS CIRC are available free in limited numbers to governmental agencies, both Federal and State. They are also available in exchange for other scientific and technical publications in the marine sciences. Individual copies may be obtained (unless otherwise noted) from NOAA Publications Section, Rockville, Md. 20852. Recent Circulars are:

315. Synopsis of biological data on the chum salmon, *Oncorhynchus keta* (Walbaum) 1792. By Richard G. Bakkala. March 1970, iii + 89 pp., 15 figs., 51 tables.

319. Bureau of Commercial Fisheries Great Lakes Fishery Laboratory, Ann Arbor, Michigan. By Bureau of Commercial Fisheries. March 1970, 8 pp., 7 figs.

330. EASTROPAC Atlas: Vols. 4, 2. Catalog No. I 49.4:330/(vol.) 11 vols. ($4.75 each). Available from the Superintendent of Documents, Washington, D.C. 20402.

331. Guidelines for the processing of hot-smoked chub. By H. L. Seagran, J. T. Graikoski, and J. A. Emerson. January 1970, iv + 23 pp., 8 figs., 2 tables.

332. Pacific hake. (12 articles by 20 authors.) March 1970, iii + 152 pp., 72 figs., 47 tables.

333. Recommended practices for vessel sanitation and fish handling. By Edgar W. Bowman and Alfred Larsen. March 1970, iv + 27 pp., 6 figs.

335. Progress report of the Bureau of Commercial Fisheries Center for Estuarine and Menhaden Research, Pesticide Field Station, Gulf Breeze, Fla., fiscal year 1969. By the Laboratory staff. August 1970, iii + 33 pp., 29 figs., 12 tables.

336. The northern fur seal. By Ralph C. Baker, Ford Wilke, and C. Howard Baltzo. April 1970, iii + 19 pp., 13 figs.

337. Program of Division of Economic Research, Bureau of Commerecial Fisheries, fiscal year 1969. By Division of Economic Research. April 1970, iii + 29 pp., 12 figs., 7 tables.

338. Bureau of Commercial Fisheries Biological Laboratory, Auke Bay, Alaska. By Bureau of Commercial Fisheries. June 1970, 8 pp., 6 figs.

339. Salmon research at Ice Harbor Dam. By Wesley J. Ebel. April 1970, 6 pp., 4 figs.

340. Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Massachusetts. By Bureau of Commercial Fisheries. June 1970, 8 pp., 8 figs.

341. Report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., for the fiscal year ending June 30, 1968. By the Laboratory staff. August 1970, iii + 24 pp., 11 figs., 16 tables.

342. Report of the Bureau of Commercial Fisheries Biological Laboratory, St. Petersburg Beach, Florida, fiscal year 1969. By the Laboratory staff. August 1970, iii + 22 pp., 20 figs., 8 tables.

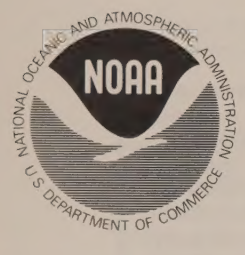
343. Report of the Bureau of Commercial Fisheries Biological Laboratory, Galveston, Texas, fiscal year 1969. By the Laboratory staff. August 1970, iii + 39 pp., 28 figs., 9 tables.

344. Bureau of Commercial Fisheries Tropical Atlantic Biological Laboratory progress in research 1965-69, Miami, Florida. By Ann Weeks. October 1970, iv + 65 pp., 53 figs.

346. Sportsman's guide to handling, smoking, and preserving Great Lakes coho salmon. By Shearon Dudley, J. T. Graikoski, H. L. Seagran, and Paul M. Earl. September 1970, iii + 28 pp., 15 figs.

347. Synopsis of biological data on Pacific ocean perch, *Sebastodes alutus*. By Richard L. Major and Herbert H. Shippen. December 1970, iii + 38 pp., 31 figs., 11 tables.

Continued on inside back cover.



U.S. DEPARTMENT OF COMMERCE
Frederick B. Dent, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Robert M. White, Administrator

NATIONAL MARINE FISHERIES SERVICE
Robert W. Schoning, Director

NOAA Technical Report NMFS CIRC-385

Fishery Publications, Calendar Year 1972: Lists and Indexes

LEE C. THORSON and MARY ELLEN ENGETT

SEATTLE, WA
NOVEMBER 1973

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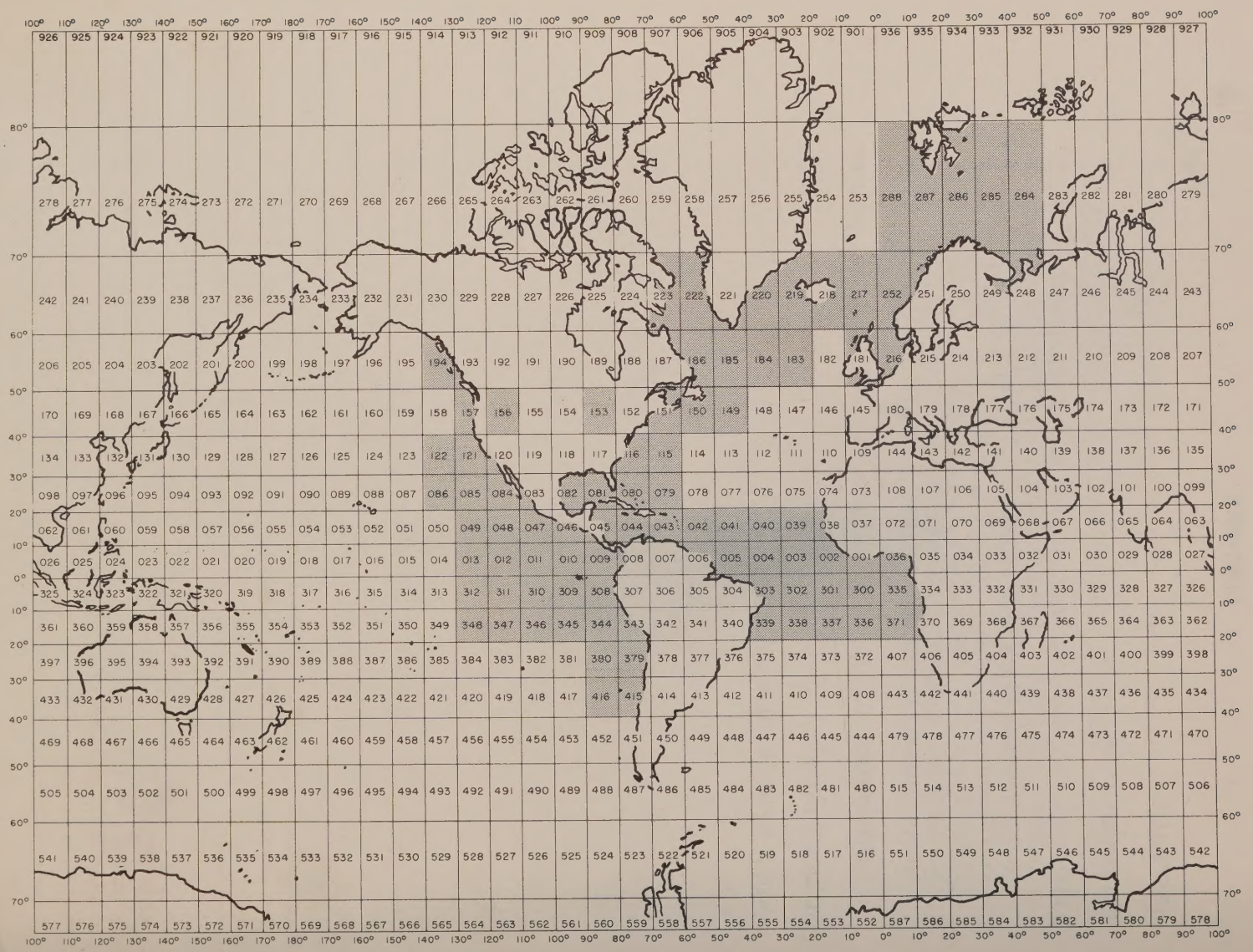

FIGURE 1.—Marsden square grid showing geographic areas (shaded) covered by fishery publications, calendar year 1972.

FISHERY PUBLICATIONS, CALENDAR YEAR 1972: LISTS AND INDEXES

By

LEE C. THORSON and MARY ELLEN ENGETT

Scientific Publications Staff
National Marine Fisheries Service

ABSTRACT

The following series of fishery publications of the National Marine Fisheries Service, National Oceanic and Atmospheric Administration, in calendar year 1972 are listed numerically (with abstracts) and indexed by author, subject, and geographic area: NOAA Technical Report NMFS CIRC (formerly Circular); Data Report; Fishery Facts; NOAA Technical Report NMFS SSRF; and NOAA Technical Memorandum NMFS.

INTRODUCTION

This document provides for calendar year 1972 numerical lists (with abstracts) and indexes by author, subject, and geographical area, the following series of publications of the National Marine Fisheries Service, National Oceanic and Atmospheric Administration:

Circular
Data Report
Fishery Facts
Special Scientific Report—Fisheries
Technical Memorandum

The document is divided into four principal sections:

Numerical listing of series (with abstracts)
Author index
Subject index
Index by Marsden squares

The last section has been included to afford easy access to the publications for those persons interested in specific geographical areas. Figure 1 shows the Marsden squares treated in the several publications.

The series abbreviations used in the indexes are:

Circular	C
NOAA Technical Report NMFS CIRC	C
Data Report	D
Fishery Facts	FF
NOAA Technical Report NMFS SSRF	S
NOAA Technical Memorandum NMFS	TM

LISTS

Circular

330, Vol. 1. EASTROPAC Atlas: Physical Oceanographic and Meteorological Data from Principal Participating Ships, First Survey Cruise, February-March 1967. By Cuthbert M. Love, (editor). June 1972, xii + 157 pp., 255 figures. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402—Price $4.75 per volume.

ABSTRACT

This atlas contains charts depicting the distribution of physical, chemical, and biological oceanographic properties and associated meteorological properties observed during EASTROPAC. EASTROPAC was an international cooperative investigation of the eastern tropical Pacific Ocean (20° N. to 20° S., and from the west coasts of the American continents to 119° W.) which was intended to provide data necessary for a more effective use of the marine resources of the area, especially tropical tunas, and also to increase knowledge of the ocean circulation, air-sea interaction, and ecology. The Bureau of Commercial Fisheries (now National Marine Fisheries Service) was the coordinating agency. The field work, from February 1967 through March 1968, was divided into seven 2-month cruise periods. During each cruise period one or more ships were operating in the study area.

On completion ot the field work the data seemed too numerous for a classical data report. Instead, it was decided to produce an 11-volume atlas of the results, with 5 volumes containing physical oceanographic and meteorological data from the principal participating ships, 5 volumes containing biological and nutrient chemistry data from the same ships, and 1 volume containing all data from Latin American cooperating ships and ships of opportunity. Extensive use was made of a computer and automatic plotter in preparation of the atlas charts. Methods used to collect and process the data upon which the atlas is based are described in detail by the contributors of the following categories of charts: temperature, salinity, and derived quantities; thickness of the upper mixed layer; dissolved oxygen; meteorology; nutrient chemistry; phytoplankton standing stocks and production; zooplankton and fish larvae; micronekton; birds, fish schools, and marine mammals.

330, Vol. 5. EASTROPAC Atlas: Physical Oceanographic and Meteorological Data from Principal Participating Ships, Second Survey Cruise, August-September 1967. By Cuthbert M. Love, (editor). September 1972, viii + 100 pp., 143 figures. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402—Price $4.75 per volume.

ABSTRACT

This atlas contains charts depicting the distribution of physical, chemical, and biological oceanographic properties and associated meteorological properties observed during EASTROPAC. EASTROPAC was an international cooperative investigation of the eastern tropical Pacific Ocean (20° N. to 20° S., and from the west coasts of the American continents to 119° W.) which was intended to provide data necessary for a more effective use of the marine resources of the area, especially tropical tunas, and also to increase knowledge of the ocean circulation, air-sea interaction, and ecology. The Bureau of Commercial Fisheries (now National Marine Fisheries Service) was the coordinating agency. The field work, from February 1967 through March 1968, was divided into seven 2-month cruise periods. During each cruise period one or more ships were operating in the study area.

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330, Vol. 6. EASTROPAC Atlas: Biological and Nutrient Chemistry Data from Principal Participating Ships, Second Survey Cruise, August-September 1967. By Cuthbert M. Love, (editor). December 1972, vi + 80 pp., 149 figures. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402—Price $4.75 per volume.

ABSTRACT

This atlas contains charts depicting the distribution of physical, chemical, and biological oceanographic properties and associated meteorological properties observed during EASTROPAC. EASTROPAC was an international cooperative investigation of the eastern tropical Pacific Ocean (20° N. to 20° S., and from the west coasts of the American continents to 119° W.) which was intended to provide data necessary for a more effective use of the marine resources of the area, especially tropical tunas, and also to increase knowledge of the ocean circulation, air-sea interaction, and ecology. The Bureau of Commercial Fisheries (now National Marine Fisheries Service) was the coordinating agency. The field work, from February 1967 through March 1968, was divided into

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331-356. Issued before 1972.

357-360. Not issued.

361. Issued in 1971.

NOAA Technical Report NMFS CIRC

362. Issued in 1971.

363. Not issued.

364. Issued in 1971.

365. Processing EASTROPAC STD data and the construction of vertical temperature and salinity sections by computer, by Forrest R. Miller and Kenneth A. Bliss. February 1972, iv + 17 pp., 7 figs., 3 app. figs. Price 30 cents.

ABSTRACT

During the EASTROPAC expeditions the STD (salinity-temperature-depth recorder) was established as the principal instrument for obtaining detailed profiles of temperature and salinity to depths exceeding 1,000 m. The STD system recorded data in digital form on magnetic tape and required computer processing to provide accurate temperatures and salinities at 1-m intervals for each hydrographic station.

Procedures for processing STD data from preprocessed digital logger tapes are described. Also included is a discussion of processing temperatures and salinities from the STD analog charts or from Nansen cast data when the digital data logger was not operative. Essential calibration of STD data from Nansen cast data is outlined. Finally, a computer program which prepares a final, annotated STD tape, with corrected temperatures and salinities, is described in great detail.

Another computer program was developed to provide for the EASTROPAC Atlas representative vertical sections of temperatures and salinities extracted from the final STD tapes. Details of computer methods employed to analyze and contour STD data are presented, and they are followed by an outline of computer requirements and program limitations.

The STD provided many detailed profiles along cruise tracks in the eastern tropical Pacific with an accuracy approaching those taken by Nansen casts; but it created new problems in processing oceanographic data. The problems, their solutions and recommendations are presented for those who may benefit from many months of processing STD data from EASTROPAC cruises.

366. Key to field identification of anadromous juvenile salmonids in the Pacific Northwest, by Robert J. McConnell and George R. Snyder. January 1972, iv + 6 pp., 3 figs. Price 20 cents, stock number 0320-0021.

ABSTRACT

A key is presented with descriptive illustrations to help in field identification of live, juvenile salmonids in fresh waters of the Pacific Northwest. Other juvenile fish that may be mistakenly identified as salmonids are included.

367. Engineering economic model for fish protein concentration processes, by K.K. Almenas, L.C. Durilla, R.C. Ernst, J.W. Gentry, M.B. Hale, and J.M. Marchello. October 1972, iii+ 175 pp., 6 figs., 6 tables, 1 app. Price $1.50.

ABSTRACT

A process engineering economic model for fish protein concentration processes has been developed. The model predicts the construction and operating costs for fish meal plants and for plants producing fish protein concentrate (FPC) by: isopropyl alcohol extraction, biological, and press cake-isopropyl alcohol extraction.

Typical process flow sheets and a computer program were developed to be used in the design and cost computations. The model provides for each process to be studied both internally and externally in comparison with alternate processes. The program and model were prepared in such a way that changes and updating may be accomplished quite readily as new information becomes available. This report contains directions for users and descriptions of the processes. A listing of the computer program and example calculations for each process are presented in the Appendix to guide the user and to illustrate the nature of the model output.

While the model does develop construction, operating, and production aspects of the processes, it does not deal with the economics of selling the products and the resulting profit and return on investment. Problems of allocation of costs and marketing arrangements are not covered in this report, but must be considered in the final decisions relating to a complete evaluation of alternatives.

368. Cooperative Gulf of Mexico estuarine inventory and study, Florida: Phase 1, area description, by J. Kneeland McNulty, William N. Lindall, Jr., and James E. Sykes. November 1972, vii + 126 pp., 46 figures, 62 tables. Price $1.25.

ABSTRACT

Newly-developed tables and maps depict the dimensions, submerged vegetation, tidal marshes, mangrove swamps, commercial oyster beds, leased oyster-rearing areas, sources of pollution, drained tidal marshes, and filled areas of Florida's west coast estuaries. Published and unpublished information on temperature, salinity, geology, artificial fishing reefs, stream discharge, human population, commercial fishing, and economic development is presented in new form.

If the total area of estuaries (3,003,312 acres = 1,215,440 ha) is considered to be the area of open water (2,081,525 acres = 842,393 ha) plus the area of mangrove swamps (393,160 acres = 159,112 ha) and tidal marshes (528,528 acres = 213,895 ha), then roughly one-half of the total area of estuaries is unvegetated; the remaining half is about equally divided among mangroves, tidal marshes, and submerged vegetation.

Human population in coastal counties increased from 614,616 persons in 1930 to 3,320,226 persons in 1970, resulting in adverse effects from pollution to 43 percent of estuarine areas, filling of 23,521 acres (9,519 ha) mainly for residential and industrial development, and draining of 26,676 acres (10,796 ha) of tidal marshes for mosquito control. Increasing population correlates directly with the number of sources of pollution, filled area, and the area closed to shellfishing by public health authorities; thus, failure to control the adverse effects of population growth will clearly result in continued rapid degradation of estuarine habitat on Florida's west coast.

369. Field guide to the angelfishes (Pomacanthidae) in the western Atlantic, by Henry A. Feddern. November 1972, 10 pp., 17 figs. Price 25 cents.

ABSTRACT

A key illustrated by photographs and brief descriptions is presented to aid in identifying the six species of angelfishes, family Pomacanthidae, found in the western Atlantic.

370. Collecting and processing data on fish eggs and larvae in the California Current region, by David Kramer, Mary J. Kalin, Elizabeth G. Stevens, James R. Thrailkill, and James R. Zweifel. November 1972, iv + 38 pp., 38 figs., 2 tables. Price 50 cents.

ABSTRACT

Descriptions are given for the methods used by the California Cooperative Oceanic Fisheries Investigations to collect and process plankton. These include details of the design of the station pattern in the survey area, the gear and methods used for plankton hauls, measuring plankton, and sorting plankton for fish eggs and larvae; some procedures for identifying fish eggs and larvae; details of "hand" processing data for standardization of numbers of organisms collected in all plankton hauls; calibration of flowmeters; and some new procedures for automatic data processing.

371. To be published in 1973.

372. Fishery publications, calendar year 1971: Lists and indexes, by Thomas A. Manar. October 1972, iv + 24 pp., 1 fig. Price 30 cents.

ABSTRACT

The following series of fishery publications of the National Marine Fisheries Service, National Oceanic and Atmospheric Administration, in calendar year 1971 are listed numerically (with abstracts) and indexed by author, subject, and geographic area: NOAA Technical Report NMFS CIRC (formerly Circular); Data Report; Fishery Leaflet; and NOAA Technical Report NMFS SSRF (formerly Special Scientific Report—Fisheries.)

373-376. To be published in 1973.

377. Fishery publications, calendar year 1970: Lists and indexes, by Mary Ellen Engett and Lee C. Thorson. December 1972, iv + 34 pp., 1 fig.

ABSTRACT

The following series of fishery publications of the National Marine Fisheries Service, National Oceanic and Atmospheric Administration (until October, 1970 the Bureau of Commercial Fisheries of the U.S. Fish and Wildlife Service) in calendar year 1970 are listed numerically (with abstracts) and indexed by author, subject, and geographic area: Circular, Data Report, Fishery Industrial Research, Fishery Leaflet, and Special Scientific Report—Fisheries.

Data Report

(Hard copies of Data Reports Nos. 71, 73 and 74 are for sale at $3.00 each and microfiche copies for 95 cents each. No. 72 is for sale at $9.00 and microfiche copies for 95 cents each by the U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22151.)

71. Predation, particularly by sculpins, on salmon fry in fresh waters of Washington, by Benjamin G. Patten. 1972, 21 pp. on 1 microfiche.

ABSTRACT

Stomach contents of 41 species of fish collected in one lake and 11 streams were examined to determine species that were predaceous on wild and cultured Pacific salmon, *Oncorhynchus* spp., fry. The only species with salmon in their stomachs were: sculpins, *Cottus* spp., coho salmon, *O. kisutch,* chinook salmon, *O. tshawytscha,* rainbow trout, *Salmo gairdneri,* and cutthroat trout, *S. clarki.* Presented are data on the number of salmon in the stomachs of the predators and on body lengths of the predator species.

72. Surface zooplankton from Auke Bay and vicinity, southeastern Alaska, August 1962 to January 1964, by Bruce L. Wing and Gerald M. Reid. 1972, 765 pp. on 12 microfiche.

ABSTRACT

A list of species, counts of each species per cubic meter, and volumes of zooplankton per 1,000 cubic meters from the marine surface waters of Auke Bay and vicinity are presented for monthly samples collected from August 1962 to January 1964. Meteorology, oceanography, and cycles of phytoplankton productivity for Auke Bay are described. A table for converting from counts to volume, wet weight, and dry weight for selected species is abstracted from the literature.

73. Hydrographic observations in Tampa Bay, Florida—1969, by Carl H. Saloman and John L. Taylor. 1972, 82 pp. on 2 microfiche.

ABSTRACT

Hydrographic data include water temperature, salinity, total phosphorus, total Kjeldahl nitrogen, pH, dissolved oxygen, turbidity, water transparency, chlorophyll *a, b,* and *c,* astacin and nonastacin carotenoids, and primary productivity based on the chlorophyll *a* extraction. Methods of collecting and analyzing samples are described. Tables summarize data collected from 30 permanent stations by mean, range, and number of observations according to month and area. Other tables summarize the mean, range, and number of observations of samples taken daily at the Laboratory dock.

74. Collections of larval Gulf menhaden, *Brevoortia patronus,* from Galveston Entrance (1959-1969) and Sabine Pass (1963-1967), Texas, by Paul L. Fore and Kenneth N. Baxter. 1972, 17 pp. on 1 microfiche.

ABSTRACT

The number of larvae, that were taken per tow with a Renfro beam trawl, and the dates of collection are given for two Texas inlets.

75. To be published in 1973.

76. Amphipoda (Hyperiidea) distribution and abundance off the coast of central west Africa, by Joseph E. Tashiro and Jack W. Jossi. 1972, 38 pp. on 1 microfiche.

ABSTRACT

Distribution and abundance of pelagic Amphipoda (Hyperiidea) are charted for 53 station positions off the coast of central west Africa. Systematics, zooplankton haul data, and species counts are shown.

Fishery Facts

1. Redfish, by George F. Kelly, Paul M. Earl, John D. Kaylor, Fred E. Lux, Henry R. McAvoy, and Ernest D. McRae. October 1972, 18 pp., 14 figs. Price 25 cents.

(No abstract.)

2. Alaska's fishery resources the Pacific herring, by Gerald M. Reid, June 1972, iii + 20 pp., 13 figs. Price 25 cents.

ABSTRACT

The Pacific herring, *Clupea harengus pallasi,* is a valuable natural resource in the coastal waters of Alaska, not only because of its direct commercial significance but also because of its importance as a component in the complex food cycle of other commercially valuable fishes.

Pacific herring are indigenous to the North Pacific rim and are closely related to the herring of the Atlantic Ocean.

Pacific herring generally spawn on intertidal vegetation in the spring. Although spawning is often successful in terms of density, subsequent mortality of eggs and larvae may exceed 99%.

Herring abundance fluctuates greatly. Biologists have attempted to understand and predict fluctuations by studying changes in the numerical strength of different year classes of herring taken by the commercial fisheries.

Commercial utilization of Alaska herring by American fishermen is at a low level because of various socioeconomic problems, although thousands of tons were taken in the past for food and industrial products. Foreign vessels are currently taking large quantities of herring in areas offshore from Alaska. A viable herring industry might develop if an economical method of producing fish protein concentrate from fatty fish is developed. Alaska herring reduced to the concentrate could provide an essential item in the diet of peoples of protein-deficient nations.

3. Dungeness crab pots, by Fred W. Hipkins. June 1972, 13 pp., 10 figs. Price 25 cents.

(No abstract.)

4. Inshore lobster fishing, by John T. Everett. October 1972, iv + 26 pp., 21 figs. Price 25 cents.

ABSTRACT

This document describes the equipment and methods now being used in the inshore lobster *(Homarus americanus)* fishery along the United States North Atlantic Coast.

NOAA Technical Report NMFS SSRF

644. Inhibition of flesh browning and skin color fading in frozen fillets of yelloweye snapper *(Lutjanus vivanus),* by Harold C. Thompson, Jr. and Mary H. Thompson. February 1972, iii + 6 pp., 3 tables. Price 25 cents.

ABSTRACT

Fresh yelloweye snapper *(Lutjanus vivanus)* which had been scaled and eviscerated were treated with the chemicals 3,3′-thiodipropionic acid, glutathione, disodium ethylenediaminetetraacetate dihydrate in combination with propyl gallate, and monotertiary butylhydroquinone. The inhibitory effects that these chemicals had on flesh browning (Maillard reaction) were studied over a 12-month frozen storage period. Also, the effects of vacuum packaging on snapper skin discoloration were studied.

645. Published in 1971.

646. Published in 1971.

647. Revised annotated list of parasites from sea mammals caught off the west coast of North America, by L. Margolis and M.D. Dailey. March 1972, iii + 23 pp. Price 35 cents.

ABSTRACT

Parasite-host and host-parasite lists, with supporting references, of the ecto- and endoparasites recorded from marine mammals of the North American west coast are provided. Excluding records in which the parasites have not been identified to the species level, there are known 15 trematodes, 3 cestodes, 10 nematodes, 7 acanthocephalans, 1 copepod, and 10 amphipods from 22 species of Cetacea; 8 trematodes, 10 cestodes, 12 nematodes, 8 acanthocephalans, 5 anoplurans, and 5 acarines from 8 species of Pinnipedia; and 4 trematodes, 2 cestodes, 1 nematode, 3 acanthocephalans, and 1 acarine from a single species of Carnivora.

Previously unpublished records which are included here are: *Anisakis simplex* from *Phocoenoides dalli* and *Orcinus orca,* British Columbia; *Cyamus balaenopterae* from *Balaenoptera musculus,* California; *Cyamus eraticus* from *Balaena glacialis,* Alaska; *Cyamus scammoni* from *Eschrichtius gibbosus,* Alaska; *Antarctophthirus trichechi* from *Odobenus rosmarus,* Alaska.

648. Published in 1971.

649. Distribution of forage of skipjack tuna *(Euthynnus pelamis)* in the eastern tropical Pacific, by Maurice Blackburn and R. Michael Laurs. January 1972, iii + 16 pp., 7 figs., 3 tables. Price 30 cents, stock number 0320-0036.

ABSTRACT

The fishery for skipjack tuna *(Euthynnus pelamis)* in the eastern Pacific Ocean might be extended if offshore areas of high skipjack abundance were known. One would expect the numbers of skipjack in these offshore areas to be related to the distribution of known skipjack forage organisms in the micronekton. The EASTROPAC oceanographic cruises yielded net-caught micronekton samples over large parts of the eastern tropical Pacific during seven successive 2-month periods. From these samples, the occurrence of organisms known to be prey of skipjack was expressed as ml/100 m^3. Charts of night and day concentrations in the upper 200 m were produced for each of the seven periods.

In the region from long 92° to 119° W the major areas of maximum concentration of potential skipjack forage remained essentially constant during most periods. Two of these areas lie parallel to the equatorial upwelling zone—one just to the north, the other just to the south. Another zonal area of abundant forage generally occurs between lat 6° and 14° N. Forage is also frequently abundant between lat 14° and 20° N and long 107° and 119° W.

The concentrations of skipjack forage in these areas are comparable with those in nearshore parts of the eastern tropical Pacific, where the present skipjack fishery occurs. The abundance of skipjack in the forage-rich offshore areas might therefore be sufficient to support commercial fishing operations. Sea-surface temperatures are generally suitable for skipjack in those areas.On three recent crossings of the equatorial region at about long 119° W, skipjack appeared to be abundant in the first three areas of high forage concentration mentioned above.

650. Effects of some antioxidants and EDTA on the development of rancidity in Spanish mackerel *(Scomberomorus maculatus)* during frozen storage, by Robert N. Farragut. February 1972, iv + 12 pp., 6 figs., 12 tables. Price 25 cents, stock number 0320-0032.

ABSTRACT

Spanish mackerel *(Scomberomorus maculatus)* were treated with antioxidant solutions containing BHA and BHT (Tenox 4); BHA, BHT, PG, citric acid, and propylene glycol (Tenox 6); Tenox 4 plus EDTA; Tenox 6 plus EDTA; $Ca(Na)_2EDTA$; $(Na)_2EDTA$; $(Ca)_2EDTA$; and $(Na)_4EDTA$ both by dipping and injecting methods. Samples analyzed at 3-month intervals showed fillets packed in vacuum and treated with EDTA remained in good condition over the 12-month storage period. However, samples treated with $(Na)_4EDTA$ remained superior to other samples throughout the storage period.

651. The effect of premortem stress, holding temperatures, and freezing on the biochemistry and quality of skipjack tuna, by Ladell Crawford. April 1972, iii + 23 pp., 3 figs., 4 tables. Price 35 cents.

ABSTRACT

This experiment was designed to determine if there were differences (biochemical and/or organoleptic) before and after canning rested and stressed skipjack tuna. The live fish were captured off Oahu and were placed in shoreside tanks in Honolulu, Hawaii. After having been under observation for 24 hr, the fish were sacrificed in a rested or stressed condition. Stress was induced by forcing fish to swim around a tank until they showed signs of exhaustion. The rested fish were kept in a separate tank and were agitated as little as possible before being sacrificed.

Some of the sacrificed tuna were canned immediately to serve as controls. Others were held in 32°, 60°, and 78° F seawater (SW) for 6 hr, and some were held in 78° F SW for 9 hr before canning. An equal number of fish from all treatments were brine frozen (for 20 hr), then thawed and canned. Sample wedges were taken before canning for measurements of glycolytic and purine degradation products. These measurements together with organoleptic evaluation were also determined on the canned product.

There were no commercially discernible differences between rested and stressed skipjack subjected to various time-temperature treatments. The relation of the measured biochemical parameters to the treatment of the fish and the subsequent relation to the quality of the canned product were studied. There were not sufficiently defined relations on which to base quality predictions.

652. Indexed bibliography of the eggs and young of tunas and other scombrids *(Pisces, Scombridae)*, 1880-1970, by William J. Richards and Witold L. Klawe. September 1972, iv + 107 pp., 1 table. Price $1.00.

ABSTRACT

This bibliography enumerates reports on the early life history of tunas and other scombrid fishes published before 1971. All the entries are indexed, usually by species, but on occasion by a larger taxonomic unit, and within each taxonomic unit the entries are indexed by one or more subjects.

653. The use of electricity in conjunction with a 12.5-meter (headrope) Gulf-of-Mexico shrimp trawl in Lake Michigan, by James E. Ellis. March 1972, iv + 10 pp., 11 figs. 4 tables. Price 25 cents.

ABSTRACT

The catching efficiency of a 12.5-meter standard shrimp trawl and the same trawl fitted with three different electrode array systems with power on and power off was investigated.

The standard trawl caught 1.54 times or 54.2% more kilograms of fish than the electrode-equipped trawl with power off. The electrode array hanging across the mouth area of the trawl acted as a visual stimulant and thus reduced the trawl's catch rate.

Overall the electrical trawl with power on caught 1.19 times or 19.0% more kilograms of fish than the electrical trawl with power off. Array 2 with power on had the best catch rate—1.86 times or 86.9% more kilograms of fish than the power off catch rate. The avoidance of fish to an electrode array was more than offset with the catch rate of array 2 with power on. The dominance patterns of the catches with each system tested did not change significantly with the exception of chub catches with array 2 with power on.

Length selectivity was highly significant for chubs caught with arrays 2 and 3 with power on. No significant length selectivity occurred with the other species landed.

654. An electronic detector system for recovering internally tagged menhaden, Genus *brevoortia*, by R.O. Parker, Jr. February 1972, iii + 7 pp., 3 figs., 1 app. Price 25 cents.

ABSTRACT

Operation and results are described of an electronic detector-recovery system for fish with internal ferromagnetic tags. The system does not interfere with the operation of fish reduction plants. Date and location of recapture can be obtained since tagged fish are detected and recovered as they are landed. Growth rates of 3.1 and 7.2 mm per month were obtained for two menhaden out 130 and 483 days. Scale analyses supported annulus formation assumption. The best location for tag injection in adult menhaden appears to be about 13 mm above and just forward of the origin of the pelvic fin. Tag incisions were healed in 85% of the fish recaptured after 10 days.

655. Immobilization of fingerling salmon and trout by decompression, by Doyle F. Sutherland. March 1972, iii + 7 pp., 3 figs., 2 tables. Price 25 cents.

ABSTRACT

Laboratory experiments revealed that some chinook salmon *(Oncorhynchus tshawytscha)* and coho salmon *(O. kisutch)* fingerlings are immobilized when decompressed from atmospheric pressure to high negative pressures. About 69% of the chinook salmon were partially or completely immobilized at 71 cm of mercury vacuum, 48% at 61 cm, 17% at 51 cm, and none at 41 cm. The effects developed rapidly, peaking 5 min after exposure. The coho salmon, in comparison, were less severely affected. Only 9% were immobilized at 71 and 61 cm of mercury vacuum (reached 10 min after exposure), 2% at 51 cm (5 min after exposure), and none at 41 cm.

Studies (with coho salmon and rainbow trout [*Salmo gairdneri*] to determine the effects of decompression within a turbine of a dam did not provide conclusive results. However, some fingerlings caught in the tailrace immediately after their release in the turbine intake were immobilized. Exposure to negative pressure below turbine runner blades is one possible cause of immobilization.

656. The calico scallop, *Argopecten gibbus*, by Donald M. Allen and T.J. Costello. May 1972, iii + 19 pp., 9 figs., 1 table. Price 35 cents.

ABSTRACT

The calico scallop, *Argopecten gibbus*, supports a developing fishery off the southeastern coast of the United States and in the Gulf of Mexico. Information is given on classification, description, distribution, environment, relative abundance, reproduction, age and growth, mortality, associated organisms, behavior, and the fishery.

657. Making fish protein concentrates by enzymatic hydrolysis. A status report on research and some

processes and products studied by NMFS, by Malcolm B. Hale. November 1972, v + 32 pp., 15 figs., 17 tables, 1 app. table. Price 50 cents.

ABSTRACT

Research into biological methods for fish protein concentrate (FPC) preparation which has been carried out within the National Marine Fisheries Service is summarized. The effects of various processing conditions and commercially available proteolytic enzymes on yields and characteristics of water-soluble fish protein hydrolysates are presented. Soluble FPC prepared from red hake *(Urophycis chuss)* tended to be deficient in either tryptophan or histidine, depending on the pH of hydrolysis. Hydrolysis of raw fish with an alkaline protease of *Bacillus subtilis* at pH 8.5 or above gave the best balance of essential amino acids and a high yield of soluble product. Pancreatin also gave very good results at pH 8.5. The protein efficiency ratio (PER) of a totally soluble FPC prepared from alewife *(Alosa pseudoharengus)* was equivalent to that of casein. Soluble products prepared from hake were equivalent to casein as a wheat supplement but not as a sole source of protein. Process outlines and preliminary cost estimates are presented for the production of two types of fish protein hydrolysates. Possible food uses and the flavor problem are discussed. This report includes a literature survey of fish protein modifications by fermentation and selected chemical hydrolysis methods as well as by enzymatic hydrolysis processes.

658. List of fishes of Alaska and adjacent waters with a guide to some of their literature, by Jay C. Quast and Elizabeth L. Hall. July 1972, iv + 47 pp. Price 50 cents.

ABSTRACT

The authors list 432 species known to occur in Alaska waters, supplemented by 137 species that have been recorded from neighboring waters and, in the authors' opinion, should be considered when new collections are identified. Species entries are annotated to include common names, recorded range, useful references, localities represented by specimens in the collection of the Auke Bay Fisheries Laboratory, and comments on Taxonomy. Recorded geographic ranges are extended for 26 species: Ophidiidae—*Spectrunculus radcliffei;* Scorpaenidae—*Sebastes emphaeus, S. nigrocinctus, S. wilsoni;* Cottidae—*Eurymen gyrinus, Gymnocanthus detrisus, G. pistilliger, Hemilepidotus zaplus, Icelus spatula, I. uncinalis, Myoxocephalus jaok, Nautichthys pribilovius, Triglops scepticus;* Agonidae—*Agonopsis emmelane, Aspidophoroides bartoni, Ocella verrucosa;* Cyclopteridae—*Careproctus melanurus, C. rastrinus, Cyclopteropsis phrynoides, Liparis bristolense, L. ochotensis, Paraliparis caudatus, P. deani, Temnocora* candida; Scombridae—*Thunnus thynnus;* Pleuronectidae—*Limanda proboscidea.*

659. The Southeast Fisheries Center bionumeric code. Part 1: Fishes, by Harvey R. Bullis, Jr., Richard B. Roe, and Judith C. Gatlin. July 1972, xl + 95 pp., 2 figs. Price $1.25.

ABSTRACT

The Southeast Fisheries Center, Pascagoula, Mississippi Laboratory uses a nine-digit numeric code to catalog marine organisms. The basic code was adapted from the FAO taxonomic code developed in 1960, to which generic and specific levels were added and considerable classification modifications adopted.

This publication provides the code listing for fishes. Succeeding publications will deal with such groups as crustacea, mollusca, and various invertebrates.

660. A freshwater fish electro-motivator (FFEM)-its characteristics and operation, by James E. Ellis and Charles C. Hoopes. November 1972, iii + 11 pp., 9 figs.

ABSTRACT

A prototype Freshwater Fish Electro-Motivator (FFEM) system was developed as a research tool to test the application of electricity for use with active and passive fishing gear for increasing the gear's catching efficiency. The system's basic characteristics and operating modes are explained. The prototype system is extremely sophisticated, and its versatility permits single or multiple time-sequenced electrode loading and various pulse patterns, and allows duty cycles over a wide dynamic electrode load range. A summary of the field testing is discussed.

661-662. To be published in 1973.

663. Fish larvae collected from the northeastern Pacific Ocean and Puget Sound during April and May 1967, by Kenneth D. Waldron. December 1972, iii + 16 pp., 2 figs., 1 table, 4 apps. tables. Price 30 cents.

ABSTRACT

Fish larvae belonging to 24 families and the suborder Blennioidea were collected from Puget Sound and the Pacific Ocean off British Columbia, Washington, and Oregon during April and May 1967. All families and the Blennioidea were present in oceanic waters, but only 13 families and the Blennioidea were present in Puget Sound. The most abundant families in the oceanic area were Scorpaenidae, Myctophidae, and Pleuronectidae, whereas in Puget Sound the most abundant families were Gadidae, Pleuronectidae, and Scorpaenidae. Variations in composition and numbers of larvae in the catch were associated with area, water depth, water temperature, and time of day at which the collections were made.

664. Tagging and tag-recovery experiments with Atlantic menhaden, *Brevoortia tyrannus,* by Richard L. Kroger and Robert L. Dryfoos. December 1972, iv + 11 pp., 4 figs., 12 tables.

ABSTRACT

Laboratory tagging experiments with adult and juvenile Atlantic menhaden were conducted at Beaufort, N.C., in 1965 and 1969. Tag-recovery experiments were done at menhaden processing plants at Beaufort, N.C. Internal

ferromagnetic body tags of appropriate sizes are suitable for tagging adults and juveniles, and the tags can be recovered effectively on magnets in the processing plants.

665. Larval fish survey of Humboldt Bay, California, by Maxwell B. Eldridge and Charles F. Bryan. December 1972, iii + 8 pp., 8 figs., 1 table. Price 25 cents.

ABSTRACT

As part of a series of investigations of the marine resources of Humboldt Bay, Calif., a larval fish survey was conducted from January to December 1969. Bottom and oblique tows were made at five sampling stations with 1-m plankton nets on alternate biweekly intervals. Thirty-seven species of larval and juvenile fishes representing 17 families were collected. In terms of larval abundance, the dominant fish was the bay goby, *Lepidogobius lepidus,* followed by Pacific herring *(Clupea harengus pallasi),* Pacific staghorn sculpin *(Leptocottus armatus),* longfin smelt *(Spirinchus thaleichthys),* and the arrow goby *(Clevelandia ios).* These five species constituted 95% of all larvae captured.

The number of larvae captured increased with increasing distance from the mouth of the Bay. The lowest number of species captured was at a station which experienced the widest range of salinities and temperatures. Peaks of seasonal abundance occurred in January and February and in April and May. Relatively few fish were captured after June. Some notable appearances of offshore spawned fishes were found in Humboldt Bay.

NOAA Technical Memorandum NMFS (Atlantic Estuarine Fisheries Center)

AEFC-1. Report of the National Marine Fisheries Service Atlantic Estuarine Fisheries Center, fiscal years 1970 and 1971, by T.R. Rice, Director and Staff. June 1972, iv + 16 pp., 14 figs.

ABSTRACT

Estuarine and radioecological research conducted during Fiscal Years 1970 and 1971 was concerned with energy relations in ecosystems, distribution and cycling of radionuclides and trace metals, and environmental stress on the physiology of marine organisms. Research on the status of Atlantic and Gulf menhaden resources included monitoring the purse seine fishery, predicting future abundance, and describing the role of menhaden in the coastal environment. Other activities reported are thread herring and blue crab programs and radiological consulting. A list of professional staff and their scientific publications is included.

NOAA Technical Memorandum NMFS (Southeast Fisheries Center)

SEFC-1. Report of the National Marine Fisheries Service Southeast Fisheries Center, Miami Laboratory, fiscal years 1970 and 1971, by Ann Weeks and Albert C. Jones. July 1972, ii + 21 pp., 16 figs.

ABSTRACT

The research program of the National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory (U.S. Department of Commerce, National Oceanic and Atmospheric Administration), Miami, FL, is described. Progress in investigations of the tropical Atlantic Ocean during Fiscal Years 1970 and 1971 is reviewed.

SEFC-2. Report of the National Marine Fisheries Service Southeast Fisheries Center, Pascagoula Laboratory, fiscal years 1970 and 1971, by Edward F. Klima and Richard B. Roe. June 1972, iv + 21 pp., 15 figs.

ABSTRACT

The National Marine Fisheries Service Southeast Fisheries Center, Pascagoula Laboratory (formerly the NMFS Exploratory Fishing and Gear Research Base) conducted research in a wide range of activities during Fiscal Years 1970 and 1971. Investigations into the application of remote sensors for resource detection were advanced using aerial photography, pulsed lasers, spectrophotometry, and low-light-level imagery. This program received national status in September 1970 with the establishment of a National Marine Fisheries Service Remote Sensing Program (now the Southeast Fisheries Center, Mississippi Test Facility Engineering Laboratory) at the Mississippi Test Facility, Bay St. Louis, Mississippi.

Assessment surveys were conducted along the outer Continental Shelf and upper Continental Slopes of the Gulf of Mexico and Caribbean Sea where deepsea prawns, crabs, and silver hake were often taken in quantity. Benthic shelf explorations were greatly facilitated by the development of a remote controlled underwater fisheries assessment vehicle (RUFAS) used successfully in assessing, monitoring, and predicting the calico scallop resource off the eastern seaboard.

A budding fishery for swordfish in the Gulf of Mexico suffered an untimely death with the discovery of high mercury concentration in swordfish.

Hydroacoustical assessment of pelagic marine resources was bolstered with the acquisition of a signal processing computer-echosounder unit (SAS) which prints out real-time information on the location and relative size of underwater targets. The system is currently undergoing extensive field testing.

New approaches were taken to sampling and harvesting coastal pelagic fishes. Underwater lights and light arrays were successfully used to attract and lead schooling fish. Artificial structures of various design and complexity were found highly successful in attracting large quantities of pelagic fishes. These applied behavior studies will provide a prime component in a new concept in harvesting coastal pelagic fishes, an automated harvesting platform.

Electrical harvesting gear is being developed at Pascagoula to increase the efficiency of available gear and to provide the technology for sampling resources presently impossible to harvest. An electrical shrimp trawl has proven highly successful and an electrical midwater trawl

is under construction. A 120 kva pulse generator is currently under construction for application in the automated fishing platform, electrical fish trawls, and electrical rough-bottom shrimp trawls.

NOAA Technical Memorandum NMFS (Southeast Region)

SER-1. Report of the National Marine Fisheries Service Gulf Coastal Fisheries Center, fiscal years 1970 and 1971. Anonymous. July 1972, iii + 26 pp., 14 figs., 4 tables.

ABSTRACT

Progress is reported at the National Marine Fisheries Service Gulf Coastal Fisheries Center (formerly the Biological Laboratory, Galveston, Texas). Emphasis is placed on shrimp, and the research involves the fields of mariculture, population dynamics, ecology, and oceanography.

SER-2. Report of the National Marine Fisheries Service Biological Laboratory, St. Petersburg Beach, fiscal years 1970 and 1971, by James E. Sykes. July 1972, 13 pp., 8 figs.

ABSTRACT

Most of the major coastal and offshore fisheries of the United States depend upon species related to rearing and nursery areas in estuaries and the nearshore zone. To maintain and increase coastal shelf fisheries, it is necessary to provide continuing biological production near shore. Such provision requires a thorough ecological knowledge of the nursery and rearing area. Currently over 6,000 engineering proposals for estuarine areas are reviewed by Federal agencies each year. In view of relentless pressures affecting estuaries, this Laboratory works with other Federal agencies and the Gulf States to provide data directly applicable to the preservation, maintenance, and enhancement of nursery areas that generate valuable commercial and recreational species.

SER-3. Report of the National Marine Fisheries Service Fishery Products Technology Laboratory, Pascagoula, fiscal years 1970 and 1971, by Travis D. Love, Mary H. Thompson, and Melvin E. Waters. June 1972, iii + 12 pp., 7 figs., 4 tables.

(No abstract.)

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